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## Resolution of carotid stenosis pre-carotid intervention: A case for selective preoperative duplex ultrasound

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## ABSTRACT

**INTRODUCTION:** Spontaneous resolution of carotid stenosis is a phenomenon that has been described in literature in the past. At present it is not routine practise to scan patients prior to carotid endarterectomy surgery within the UK.

**PRESENTATION OF CASE:** A 58 year old female presented to hospital with a history of sudden onset headache and left sided weakness. CT head showed findings in keeping with an acute right MCA territory infarct. A duplex ultrasound scan showed echolucent material in the right internal carotid artery forming a greater than 95% stenosis. The scan was unable to visualise the patency of the vessel distally due to the position of the mandible. The patient was provisionally listed for carotid endarterectomy. An MRA was requested prior to surgery to assess the patency of the distal internal carotid artery. The MRA of the carotids showed normal appearance of the common carotid, internal and vertebral arteries with no definite stenosis. A repeat duplex ultrasound confirmed there was no significant stenosis.

**DISCUSSION:** The finding of complete resolution of stenosis on MRA was an unexpected event. Had the initial duplex imaging allowed visualisation of the distal vessel patency, our patient would have undergone unnecessary carotid surgery with the associated morbidity and mortality.

**CONCLUSION:** This case report draws attention to the benefits of selective preoperative scanning, in sparing patients from unnecessary surgery as a result of finding occlusion or resolution of a previously diagnosed carotid stenosis.

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## 1. Case Report

A 58 year old female presented to hospital with a two day history of sudden onset headache and left sided weakness. She had no prior relevant medical history and was a non-smoker. Examination elicited a left sided facial droop and reduced power of 3/5 of the left upper and lower limbs.

CT head showed findings in keeping with an acute right MCA territory infarct. ECG and echocardiogram was unremarkable. The patient was commenced on dual anti-platelet medication and a statin.

A duplex ultrasound scan showed soft echolucent material in the right internal carotid artery forming a greater than 95% stenosis

(Fig. 1). The scan was unable to visualise the patency of the vessel distally due to the position of the mandible.

Over the next 48 h the patient's symptoms improved. She was discharged seven days after admission. The following day the patient was assessed in the vascular clinic. Her symptoms had completely resolved. The patient was counselled and provisionally listed for carotid endarterectomy. An MRA was requested prior to surgery to assess the patency of the distal internal carotid artery. In the interim the patient was maintained on best medical therapy.

Three weeks after the initial duplex ultrasound, an MRA of the carotids showed normal appearance of the common carotid, internal and vertebral arteries with no definite stenosis (Fig. 2). To verify this finding a repeat duplex ultrasound was performed. This corroborated with the MRA scan findings and showed a mixed and dense plaque forming a less than 30% stenosis (Fig. 3a, b). The patient's operation was cancelled. The patient was well 3 months later.

## 2. Discussion

In symptomatic patients with carotid disease, carotid endarterectomy (CEA) is indicated for individuals demonstrating carotid stenosis of 50–99% according to NASCET criteria, or 70–99%

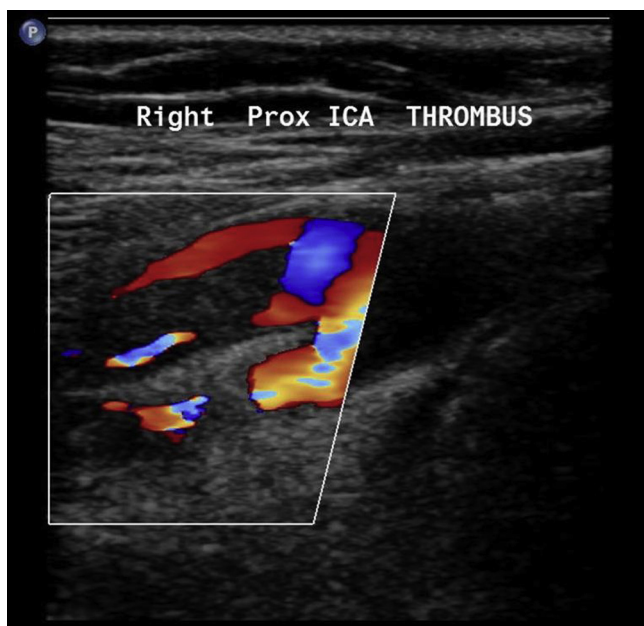
**Abbreviations:** CT, computed tomography; CEA, carotid endarterectomy; MCA, middle cerebral artery; MRA, magnetic resonance angiogram; DS, duplex scanning; ECG, electrocardiogram; NASCET, north american symptomatic carotid endarterectomy trial; ECST, european carotid surgery trial; CA, coronary angiography.

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**Fig. 1.** Duplex ultrasound revealing soft echolucent material in the right internal carotid artery.

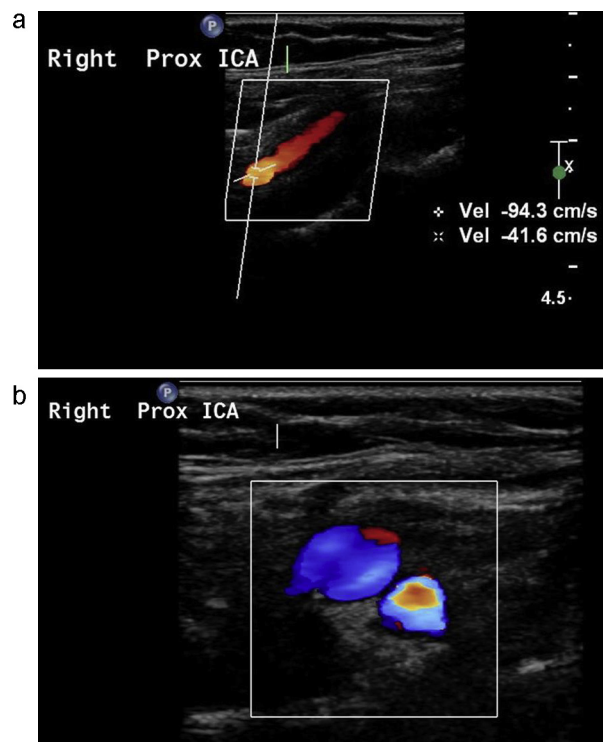


**Fig. 2.** MRA carotids showing normal appearance of the common carotid, internal and vertebral arteries.

according to ECST criteria; within a maximum of two weeks from the onset of symptoms [1].

Cerebral coronary angiography (CA) is the gold standard method for evaluation of internal carotid artery stenosis [2]. However, due to its invasive nature and associated risks of morbidity and mortality, it has been replaced by non-invasive investigations including duplex scanning (DS) and magnetic resonance angiography (MRA) [2]. Replacing CA requires that the non-invasive tests be highly specific as well as sensitive. A number of studies have advocated the combined use of MRA and DS to attain the sensitivity and specificity of CA [3–5].

Spontaneous resolution of an acute extra-cerebral coronary artery occlusion was previously considered to be a rare occurrence with few cases being described. Recent studies however have



**Fig. 3.** Carotid duplex revealing resolution of stenosis.

shown the incidence of such cases to be more frequent than previously thought [6–9]. The mechanism is not understood but may represent spontaneous resolution of thrombus within the carotid artery or possibly resorption of haematoma within a haemorrhagic plaque.

As a stenosis was clearly evident on duplex scanning, our patient was provisionally booked for carotid endarterectomy. Due to duplex imaging restrictions related to the mandible obscuring views of the distal carotid, an MRA was requested to exclude complete occlusion distally, a contraindication for CEA. The finding of complete resolution of stenosis on MRA was an unexpected event. To verify results and exclude technical error, duplex ultrasound was later undertaken which confirmed findings.

At present it is not routine practice to undertake immediate preoperative duplex imaging prior to CEA. Had the initial duplex imaging allowed visualisation of the distal vessel patency, our patient would have undergone unnecessary carotid surgery with the associated morbidity and mortality.

This case report draws attention to the benefits of selective preoperative scanning based on plaque morphology, in sparing patients from unnecessary surgery as a result of finding occlusion or resolution of a previously diagnosed carotid stenosis.

#### Conflicts of interest

None to declare.

#### Sources of funding

None to declare.

#### Consent

We have obtained written consent from the patient and we can provide a copy of this letter to the Editor, should the Editor ask to see it.

### Author contribution

IZ was in charge of the patient's care; MA was involved in the patient's care, identified the case as a possible case report due to the lessons that could be learnt. AA performed a literature search; AA, MA and IZ were involved in the writing up of the case and all authors have viewed the final case report.

### Acknowledgements

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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